

## MULTI-LAYER CELL ENCAPSULATION FOR TISSUE ENGINEERING

### ABSTRACT OF THE DISCLOSURE

A multi-layered microcapsule has an inner extracellular matrix and an outer shell. The inner extracellular matrix includes a first inner layer of biopolymer and a second intermediate layer of polymer that provides partial immune-protection and holds the first layer in place. The outer shell can form an exoskeleton to provide mechanical stability. Each of the individual layers can be varied to optimize mechanical stability, cell function, and immuno-protection.